

**REMARKS**

The preceding claim amendments and the following remarks are submitted as a full and complete response to the Office Action issued on July 24, 2008. Claims 1-3 and 5-9 have been amended. The details of the amendments are explained in the relevant sections below. No new matter has been added. Claim 4 has been cancelled. Claims 10-12, each of which is dependent from claim 1, have been added. Support for the new claims can be found from the original claims 1 and 4 and throughout the specification, for example, at paragraphs [0042]-[0044]. Accordingly, upon entry of the claim amendments, claims 1-3 and 5-12 are pending.

**Comments on the Office's "Response to Election/Restrictions"**

Applicants note that the Office Action states that "claims 4-9 are withdrawn from further consideration as being directed to a non-elected invention," which seems to indicate that the previous Action was for restriction requirement. (emphasis added). However, the previous Action issued on March 26, 2008 was for requiring an election of species and thus Applicants elected certain compounds as a single species for each of the Formulas 1, 2 and 3 recited in claim 1. To clarify the nature of the previous Office Action, the Examiner, Shafiqui Haq and the Applicants' representative had a telephone call on October 23, 2008. In this call, Mr. Haq confirmed that the previous Office Action was for election of species and not for restriction requirement. In addition, both agreed that since all of the claims 4-9 are dependent from claim 1 which reads on the elected species, claims 4-9 read on the elected species and should have been examined together with claims 1-3. Thus, Mr. Haq assured that claims 4-9 will be examined together with claims 1-3 in the instant application. Relying on the Office's representation, Applicants respond to the

outstanding Office Action assuming that claims 4-9 will be examined in the instant application.

**Claim Rejections under 35 USC §112, second paragraph**

The Office has rejected claims 1-3 under 35 USC §112, second paragraph as allegedly indefinite because the language in claim 1 is confusing as to which compounds are represented by formula 2 and formula 3. The Office suggests rewriting claim 1. Applicants respectfully submit that the rejection of claim 1 becomes moot because claim 1 has been amended to remove the recitations of formula 2 and formula 3. Applicants note that claim 12 recites the deleted recitations. However, Applicants respectfully submit that claim 12 is written to clarify which compounds are represented by formula 2 and 3. Reconsideration and withdrawal of this rejection are respectfully requested.

**Claim Rejections under 35 USC §103(a)**

The Office has rejected claims 1-3 under 35 USC §103(a) as allegedly obvious over Lee et al. (Agnew. Chem. Int. Ed. 2001: "Lee"). The Office notes that Lee discloses a rotaxane compound, which is very similar or functionally equivalent to the compound of formula (5) recited in claim 3. According to the Office, since similar compounds are expected to have similar properties, the claimed compounds would have been obvious from the compounds of the reference in the absence of any unobviousness or unexpected results. Applicants respectfully disagree.

At the outset, Applicants note that claim 1, together with its dependent claims, have been amended to be directed to a solid substrate for a biochip comprising a compound represented by Formula 1. The compound of formula 1 provides a

linkage layer with a predetermined spacing in the biochip by being bonded to the solid substrate.

Lee discloses a novel polyrotaxane and a preparation thereof. However, Lee fails to teach or suggest that the disclosed compound can be used as a linkage layer formed in a solid substrate for a biochip. Thus, in view of the lack of relevant teaching in Lee, Lee would not have motivated one skilled in the art to use the disclosed compound in a substrate for biochip with a reasonable expectation of success. Therefore, Applicants respectfully submit that there is no *prima facie* case of obviousness established.

Even if there were a *prima facie* case, it is effectively rebutted by unexpected results of the claimed solid substrate. A biochip includes a solid substrate (a support layer), a molecular layer (a linkage layer) formed on the solid substrate and having an end functional group that can be chemically bonded with DNA or protein, and a biomaterial layer having DNA or protein that can selectively interact with a target material to be assayed. See Para. [0006] of the Specification. In the claimed solid substrate, the compound of Formula 1 is used to separate molecules within a linkage layer by an optimally predetermined distance and thus effectively reduces a steric hindrance caused by the structural change of biomaterials. Thus, the claimed solid substrate ensures constant sensitivity and selective interaction in a biochip. These advantages of using the claimed solid substrate comprising the compound of formula 1 as a linkage layer have not been taught or suggested in the prior art, let alone in Lee. Therefore, the constant sensitivity and selective interaction in a biochip, which are successfully achieved by using the claimed solid substrate, are totally unexpected to one skilled in the art. Thus, Applicants respectfully submit that claims 1-3 would not have been obvious over Lee.

Accordingly, reconsideration and withdrawal of the obviousness rejection are respectfully requested.

Claims 7-9 are directed to a gene chip, a protein chip and a sensor for biomaterial assay comprising the claimed solid substrate, respectively. To the extent that the claimed solid substrate is patentable over Lee, the claimed chip or sensor should be considered patentable.

In light of the foregoing, Applicants submit that all outstanding rejections have been overcome, and the instant application is in condition for allowance. Thus, Applicants respectfully request early allowance of the instant application. The Commissioner is hereby authorized to charge any fees or credit any overpayment to Deposit Account No. 02-2135.

Respectfully submitted,

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